

**WHAT IS CLAIMED IS:**

1. A slide drive device for a press machine having a slide, comprising:  
means for adjusting said slide drive device; 12

said adjusting means being effective to adjust a stroke of said slide;

5 said adjusting means being pivotable about a center position to adjust said stroke; 207

said center position being one of a top and a bottom dead center position  
of said slide;

said adjusting means receiving a reciprocating motion;

10 means for guiding said slide drive device; 14

a connecting link; 30

said connecting link being effective to transfer said reciprocating motion  
to said guiding means;

15 said guiding means being effective to convert said reciprocating motion  
to a guiding displacement; 13

at least one drive branching link in said guiding means; 34

at least one of a first and a second upper toggle means;

said at least one upper toggle means for driving said slide in a cycle; 30

20 said at least one drive branching link transferring said guiding  
displacement to said one upper toggle means; and

said one upper toggle means being effective to transfer said guiding  
displacement to said slide and drive said slide through said cycle.

2. A slide drive device, according to claim 1, further comprising:

a connecting rod; 45

25 said connecting rod slidably guided by said adjusting means;

a crank shaft; 14

an eccentric part on said crank shaft; 20

said eccentric part having said reciprocating motion;

said connecting rod operably connects said eccentric part to said adjusting 22

5 means; and

said connecting rod being effective to transfer said reciprocating motion  
to said adjusting means where by said slide operates through said cycle.

3. A slide drive device, according to claim 2, wherein:

said adjustment means is operably affixed to said connecting rod; 45

10 said adjusting means is operable to guide said connecting rod along a  
specified trajectory; and

said adjusting means is pivotable about said center position to adjust said  
specified trajectory whereby said stroke is adjusted.

4. A slide drive device, according to claim 3, further comprising:

15 said first and said second upper toggle means;

a rotation center in each said first and second upper toggle means;

said rotation center permitting said first and second upper toggle means  
to rotate in an arc;

20 a first link connects each said rotation center to said at least one drive  
branching link;

said at least one drive branching link effective to transfer said guiding  
displacement to each said first and second upper toggle link means;

a first and a second lower toggle link;

25 a second link operably connects each said rotation center to each  
respective said lower toggle link; and

said first and second upper toggle means being effective to transfer said guiding displacement through said second links to respective said first and second lower toggle links and said slide whereby said slide operates through said cycle while maintaining a left and right balance.

- 5           5. A slide drive device, according to claim 4, further comprising:  
a guide board in said adjusting means;  
a groove in said guide board;  
a slider being slidable in said groove;  
a pin extending from said slider;  
10       said groove and said pin being pivotable about said center position;  
one end of a first and second end of said connecting rod;  
said one end operably fixed to said pin; and  
said slider and said pin being effective to transfer said reciprocating  
motion to said connecting link and said guiding means.

- 15           6. A slide drive device according to claim 5, further comprising:  
a base in said guiding means;  
a groove in said base;  
said groove being along a centerline between each said upper toggle  
means;  
20       a slider being slidable in said groove;  
said connecting link operably connected to said slider;  
said connecting link transferring said reciprocating motion to said slider  
whereby said slider operates along said centerline;  
said at least one drive branching link operably connected to said slider;  
25       and

said at least one drive branching link and said slider transferring said guiding displacement to said first and second upper toggle means whereby said slide operates through said cycle while maintaining a left and right balance along said centerline.

- 5           7. A slide drive device according to claim 6, further comprising;  
a trajectory pin;  
a trajectory forming link;  
said trajectory pin in said adjusting means;  
said trajectory pin opposite said center position on said guide board;  
10          said trajectory forming link operably connecting said trajectory pin to said  
one end of said connecting rod; and  
said trajectory pin, said trajectory forming link, and said adjusting means  
being effective to convert said reciprocating motion of said one end to an arc-  
shaped trajectory.

- 15          8. A slide drive device according to claim 6, wherein:  
said adjusting means is operable at a position equidistant between said first  
and second upper toggle means;  
said crank shaft and said eccentric part is below said adjusting means; and  
said guide means is above said adjusting means opposite said crank shaft.

- 20          9. A slide drive device according to claim 6, further comprising:  
a first and second dynamic balancer means;  
a first and second retention link;  
said first and second retention links operably connecting each respective  
said upper toggle means to each respective said dynamic balancer means; and  
25          each said first and second dynamic balancer means and said first and  
second retention links having a shape and a weight adaptable to each respective

said first and second upper toggle link and said slide whereby vibration is minimized when said first and second upper toggle means drive said slide in said cycle

10. A slide drive device, according to claim 5, further comprising:

a first pin in each said first and second upper toggle means;

said first links connects said first pins to each respective said rotation center on each said first and second upper toggle means; and

said at least one drive branching link operably connecting said first and second upper toggle means at said first pins on a common inner tangent line to each said arc.

11. A slide drive device, according to claim 10, further comprising:

a first and second end on said at least one drive branching link;

said first and second ends operably at said first pins on said first and second upper toggle means;

a connection position on said drive branching link between said first and second ends; and

said connecting link operably connecting to said drive branching link at said connection position along said drive branching link..

12. A slide drive device, according to claim 11, further comprising:

a first and second dynamic balancer means;

a first and second retention link;

said first and second retention links operably connecting each respective said upper toggle means to each respective said dynamic balancer means; and

each said first and second dynamic balancer means and said first and second retention links having a shape and a weight adaptable to each respective said first and second upper toggle link and said slide whereby vibration is

minimized when said first and second upper toggle means drive said slide in said cycle

13. A slide drive device, according to claim 12, further comprising:  
said connecting link operably connects to said drive branching link at said  
5 connection position;

said connection position being equidistant said first and second ends; and  
said drive shaft and said adjusting means are above said first and second  
upper toggle means and said drive branching link.

14. A slide drive device, according to claim 12, further comprising:  
10 said connecting link operably connects to said drive branching link at one  
of said first and second ends; and

said drive shaft and said adjusting means are below said first and second  
upper toggle means and said drive branching link.

15. A slide drive device, according to claim 12, further comprising:  
15 said connecting link operably connects to said drive branching link at one  
of said first and second ends;

said drive shaft is below said first and second upper toggle means;

said adjusting means is above said first and second upper toggle means  
opposite said drive shaft; and

20 said guiding means is between said drive shaft and said adjusting means.

16. A slide drive device, according to claim 12, further comprising:

said connecting link operably connects to said drive branching link at one  
of said first and second ends;

said drive shaft above said first and second upper toggle means;

25 said adjusting means below said first and second upper toggle means  
opposite said drive shaft; and

said guiding means is between said drive shaft and said adjusting means.

17. A slide drive device for a press machine having a slide, comprising:  
means for adjusting said slide drive device;

one of a top and a bottom dead center position of said slide;

5 said adjusting means permitting adjustment of said slide;

said adjusting means permitting said adjustment without changing said one  
dead center position; and

said adjustment changing said other dead center position of said slide.

18. A slide drive device, according to claim 17, further comprising:

10 means for guiding said slide drive device;

at least one of a first and second upper toggle means;

said at least one upper toggle means driving said slide in a cycle; and

said guiding means being effective to transmit said adjustment to said one  
upper toggle means whereby said stroke is adjusted without changing said other  
15 dead center position.

19. A slide drive device, according to claim 18, further comprising:

a center position on said adjusting means;

said center position being proximate said one dead center position;

said adjusting means being operable about said center position to effect

20 said adjustment;

20. A slide drive device, according to claim 19, further comprising:

a connecting rod;

said connecting rod on said adjusting means;

said connecting rod receiving a reciprocating motion and transmitting said

25 reciprocating motion to said adjusting means;

a connecting link;

said connecting link on said adjusting means;  
said connecting link being effective to transmit said reciprocating motion  
from said adjusting means to said guiding means; and  
said guiding means being effective to convert said reciprocating motion  
5 to a guiding displacement, whereby said slide operates in said cycle.

21. A slide drive device, according to claim 20, further comprising:

at least one drive branching link;

said drive branching link in said guiding means; and

10 said drive branching link being effective to transfer said guiding  
displacement to one upper toggle link, whereby said slide is driven in said stroke.

22. A slide drive device, according to claim 21, wherein:

said drive branching link is effective to transmit said adjustment to said  
one upper toggle link, whereby said slide is adjusted in said stroke.

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